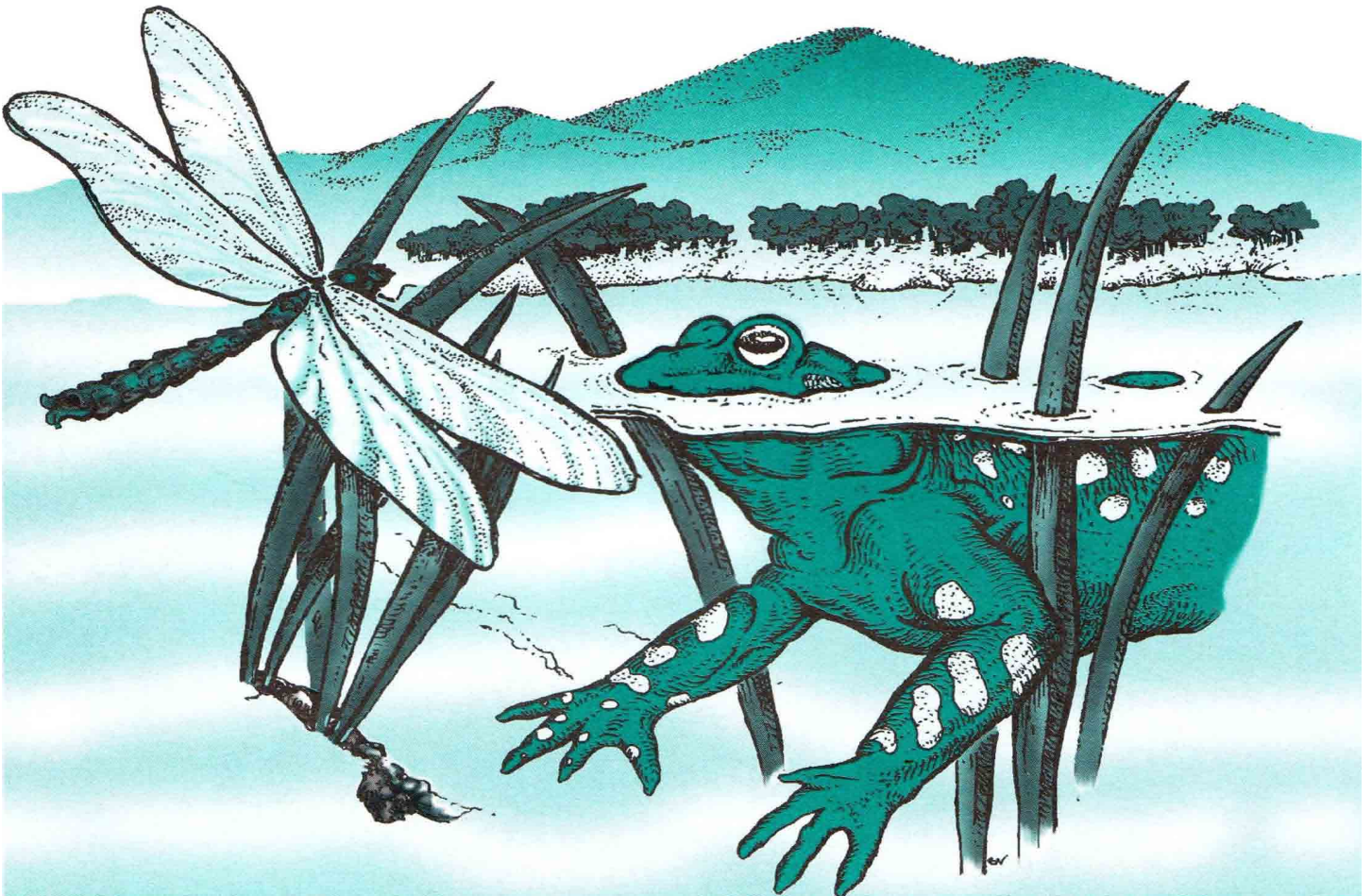


The Rio Grande and Me

El Río Grande y Yo

A Teacher's Guide
to the BioVan



Grade Level : K-1

ABQ BioPark
903 Tenth St. SW
Albuquerque, NM 87102



What is the BioVan?

The BioVan is an outreach program for the Albuquerque Biological Park, which consists of the Zoo, Botanic Garden, Aquarium and Tingley Beach. The mission of the BioVan is to give students an introduction to the diversity and interdependence of life and to encourage stewardship. The BioVan theme follows the course of the Rio Grande as it starts in the San Juan Mountains of Colorado and empties into the Gulf of Mexico and open ocean of the Atlantic.



Why the BioVan?

The Rio Grande and Me. El Río Grande y Yo. It's our river and it's important to us: to the life it supports here in Albuquerque as we live alongside it, to the Gulf of Mexico nourished by its fresh water and to the oceans of the world to which it connects. Water is a critical natural resource and precious to us, especially in the Southwest Desert. The Rio Grande supports mountain, forest, river and desert ecosystems and all the plant and animal life associated with them in an interdependent web that extends further than we can imagine. In the end, what counts most is that we must be good stewards of the river, our Rio Grande. The ABQ BioPark and the BioVan help this happen.

How does the BioVan work?

The BioVan is staffed by environmental educators, a teaching artist and volunteer BioVan Rangers. It includes live animals, plants, interactive games and a performance stage. Using a variety of teaching strategies, the BioVan combines science with the arts. Other components of the program include a teacher orientation, a BioBox that contains hands-on loan materials and grade-specific Teacher's Guides.



Who supports the BioVan?

The BioVan is funded entirely through the New Mexico BioPark Society (NMBPS). Through their generous support of this program, the NMBPS demonstrates its commitment to conservation education and to the wider community. This support enables the BioVan to visit Albuquerque-area elementary schools free of charge! If you appreciate this effort, please send your comments to BioPark Education, 903 10th St. SW, Albuquerque, NM 87102, and we will pass on your gratitude to the New Mexico BioPark Society.

How to use the Teacher's Guide

BioVan Teacher's Guides are available for grades K - 1, 2 - 3 and 4 - 5. The same key concepts are noted in each Teacher's Guide. These concepts are to help guide the teacher throughout the BioVan learning experience. The grade level concepts do vary and are designed to build upon the previous grade concepts. The grade level concepts are for the students. Suggested resources are listed, including reference books for teachers, books for students use and local agencies that offer additional relevant resources.

Each Teacher's Guide has three lessons: Water as a Natural Resource, The Rio as an Ecosystem and Stewardship. Each of the lessons has two activities: one activity is hands-on and one activity is pencil-and-paper with the worksheet provided. Each lesson is designed to interrelate with the other lessons within that guide and to build upon the same lesson in the other two grade-specific guides.

Key Concepts

for teachers

Adaptation—A modification of an organism or its parts which enables it to survive and reproduce in its environment.

Aquifer—An underground layer of rock, gravel or sand that stores water.

Biodiversity—The variety of plant and animal species in an environment.

Conservation—The conscious use of natural resources in a way that assures their availability to future generations.

Ecosystem—A stable, naturally occurring system of interdependent living and non-living things.

Habitat—The dwelling place of a living thing, chosen for its availability of suitable shelter, space, food and water.

Interdependence—The relationships among living and non-living elements of the environment.

Natural Resource—A portion of the environment that can be drawn upon to care for a need

Pollution—Any substance deposited in air, water or land leading to a condition of impurity, unhealthiness or hazard.

Riparian—Relating to the bank of a waterway such as a river.

Stewardship—The wisdom and respect we demonstrate to all living organisms and the habitats entrusted to our care.

Grade Level Concepts

for students

Animal—A living thing that gets food from outside its body.

Living—To be able to move, reproduce, grow and react.

Non-living—To be unable to move without help, reproduce, grow and react.

Observe—To learn by watching.

Plant—A living thing that uses the sun to make, or help make, food.

Resources

BOOKS FOR STUDENTS

Guiberson, Brenda. *Cactus Hotel*.

Fichter, George S. *Starfish, Seashells & Crabs*

Taylor, Barbara. *Riverlife, Look Closer*

Cole, Joanna. *Magic Schoolbus Waterworks*

BOOKS FOR TEACHERS

Golden Field Guides

Parker, Steve. *Pond and River*

Olin, George. *Mammals of the Southwest Desert*

Caduto, Michael J. and Joseph Bruchac. *Keepers of the Earth: Native American Stories and Environmental Activities for Children*

AGENCIES

Albuquerque Bernalillo County Water Utility Authority
www.abcwua.org/education/

City of Albuquerque, Water
cabq.gov/community-services/environment-and-health/water

New Mexico Museum of Natural History and Science
1801 Mountain Rd. NW Albuquerque, NM 87104
www.nmnaturalhistory.org

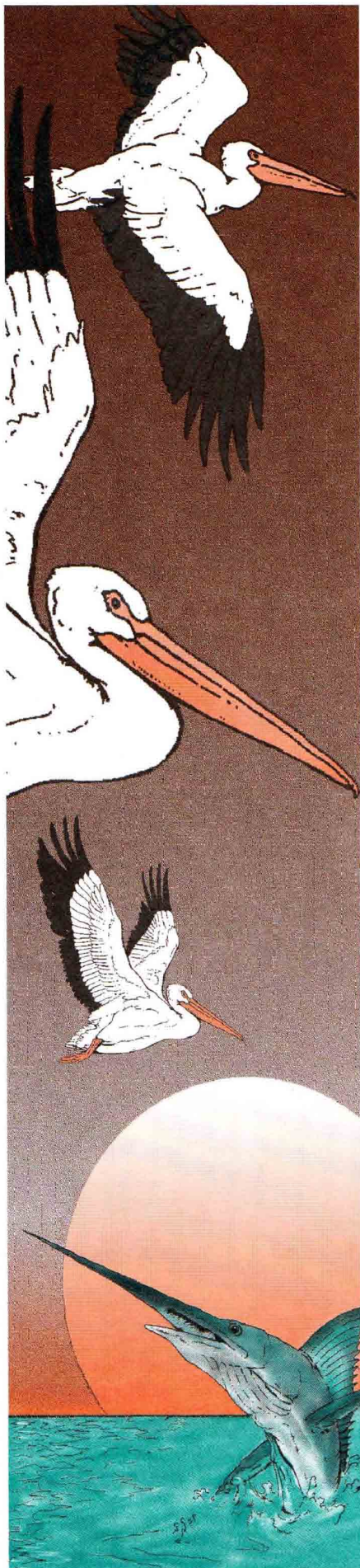
U.S. Bureau of Reclamation (upper Colorado region)
www.usbr.gov/uc/

Office of the State Engineer, water conservation
www.ose.state.nm.us/conservation_index.html

ADDITIONAL RESOURCES

Project WET
projectwet.org

Environmental Education Association of NM
www.eeanm.org



Water as a Natural Resource

All living things must have water to survive. In their search for survival, many species, including humans, migrate to water. Early human inhabitants of the Rio Grande Valley, the Pueblo Peoples, lived along the Rio, taking advantage of water found in oxbow marshes as well as riverside springs like La Joya near Belen. They built homes near the water and it played an important part in their ceremonies. Later, Spanish Colonial settlers took water from the river for irrigation. Their ambitious projects further enhanced the naturally fertile area along the river's edge. Today, Albuquerque residents of the Rio Grande Valley get all of their fresh water from an underground aquifer. In an aquifer, rainwater seeps through the ground and is trapped by natural rock formations. As fresh water is needed, it is pumped out and into homes. These water sources are limited, so it is important that we learn to use water wisely and protect it from pollutants.

Dear Diary

Record ways people along the Rio Grande use the natural resource of water.

Language Arts: Share ideas and experiences.

Social Studies: Discuss the importance of water to life.

Math: Collect, organize and describe data.

Introduction: Water from the Rio Grande is used for irrigation, recreation and industry. Individuals use water in a variety of ways, too. Use the following questions to start a discussion about water usage:

- How many ways do you use water?
- How much water do you drink in a day?
- Do you think people would be living here without the Rio Grande?



Drip, Drip

Identify where the water we use in Albuquerque comes from.

Social Studies: Understand the basic needs and wants of people.

Science: Relate common inventions to their problems.

Introduction: With today's technology we get water with a turn of a faucet. This simplicity makes it easy to forget the source. Begin a discussion about where we get our water.

- Why do you think Albuquerque is so close to the Rio Grande?
- Where can we find water nearby?
- Where does the water we use in our homes every day come from?
- What is an aquifer?



WORKSHEET

Materials: *Dear Diary* worksheet; pencils and crayons.

Procedure: Be sure students understand how the diary is set up and what each symbol means (wash hands, brush teeth, bath, drink, water for pets, water plants, other). Have them make a tally mark in the appropriate space each time they use water in the ways listed. Because this activity is five days long, you will need to remind students each day to record their usage.

Another variation of the diary is to keep a record of how water is used in school.

Wrap Up: After completing the diary, ask students to share their findings...

- Who was surprised at how much water they use? Why?
- What was the same in everyone's diary? What was different?
- What might a restaurant owner have in her diary? A fire fighter's diary?
- How can you conserve water on a daily basis?

To help the students understand the effect of their individual actions, create a class bar graph depicting the total water usage. Label the type of use on one side and the amount of times used across the bottom. Draw a different colored bar for each category.



ACTIVITY

Materials: 1 liter plastic soda bottle; sand; clear bowl; 1 cup of water.

Procedure: Fill the bowl with wet sand. Cut 4 1/2" from the top of the plastic soda bottle to make a funnel. Fill the base of the bottle with water. Place the funnel, point down, into the sand-filled bowl. Slowly pour water into the funnel.



Ask students to describe what they see.

Wrap Up: After several students have shared their observations, explain that this is how rainfall is stored in an aquifer. Ask:

- What happens to an aquifer when it doesn't rain?
- How might the water get from the aquifer to our homes?
- Why do we use water from the aquifer and not directly from the Rio Grande?































The Rio Grande and Me

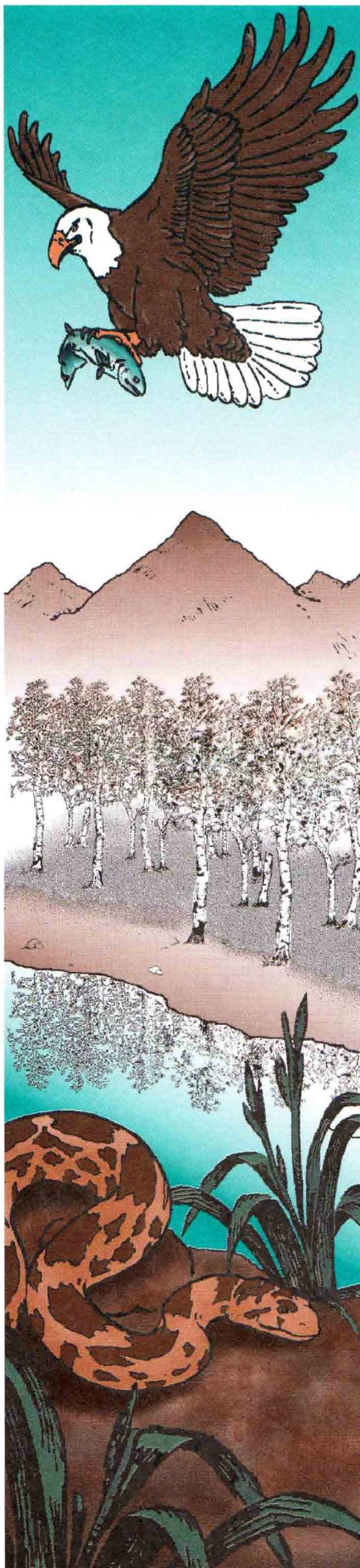
El Río Grande y Yo

Explorer's Name _____

Dear Diary...

How I used water today:

	wash hands	brush teeth	bath or shower	drink water	water for pets	water plants	anything else?
Day 1							
Day 2							
Day 3							
Day 4							
Day 5							



The Rio as an Ecosystem

All animals live where they have access to the resources they need. From prehistoric times to the present, people, plants and animals have all coexisted along the Rio Grande. The fifth longest river in North America, the 1,885-mile-long Rio Grande presents an excellent example of a riparian zone, a ribbon of green that travels through the arid southwest landscape. This green corridor helps reduce floods, improve water quality and channel excess water to replenish the aquifer. The Rio is also an environment providing food, shelter and cover for such widely varying species as the raccoon, spadefoot toad, roadrunner and black-chinned hummingbird. Protecting the Rio Grande ecosystem provides us with living examples of the relationships among living and non-living things. As we study these relationships we learn more about the workings of nature and our place in the ecosystem, and why conservation is so important.

Is It Alive?

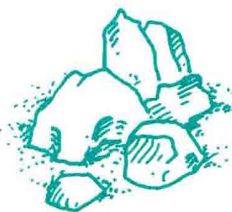
Distinguish between living and non-living things.

Science: Observe and describe similarities/differences among plants and animals. Observe and classify objects by more than one attribute.

Language Arts: Write to express ideas using pictures and symbols.

Introduction: Lead a discussion with the students about the differences between living and non-living things:

- How are people and animals similar?
- How are people and plants similar?
- How are plants and people different?
- How are rocks and people different or similar?
- Can you name some living things?
- Can you name some non-living things?



Color It Wild!

Recognize the ways in which living and non-living things interact with each other in the Rio Grande ecosystem.

Science: Investigate and show ways people depend on plants and animals.

Social Studies: Discuss the importance of water to life.

Art: Create an original piece of art and describe it.

Introduction: Introduce the concept that a river is one kind of ecosystem - a place where living and non-living parts interact with each other. For example, the river provides water for plants to grow, which in turn can provide food or shelter for animals. Begin a discussion about interdependence using the questions below.

- How do animals/plants use the river?
- How do people use the river, a non-living thing?
- What parts of the river can animals/plants use?



ACTIVITY

Materials: Paper; pencils, crayons.

Procedure: Have the students fold a sheet of paper in half. Tell them to draw a happy face (living) at the top of the paper in one column and a rock (non-living) in the other. Have the students bring these charts on a nature walk. Find a spot outside where the students can stop and observe the environment. For each living or non-living thing they find, have them draw a symbol of what they find in the appropriate column. Remind them that they are guests visiting a habitat and they should not pick up or remove a living or non-living thing from the place where it was found.

Wrap Up: When you return to the classroom, discuss their findings.

- Were there any living things that looked non-living?
- Did you see any living things using non-living things?

Remind the students that as people we differ from other living things because we can purposely change the things we find in our environment to fit our needs. But, we must realize that the changes we make can affect the future of other living and non-living things.



WORKSHEET

Materials: *Color It Wild!* worksheet; pencils; crayons.

Procedure: Have students complete the worksheet. Use the picture on the worksheet to help them understand that a river is home to many kinds of plants and animals. Allow them time to discuss the many ways people might use the river, too.

Wrap Up: Find out how much the students understand about the Rio Grande.

- What might happen to plants/animals if there were no water in the riverbed? too much?
- What might happen to animals if there were no plants?
- What might happen to plants if there were no animals?

Make a river mural. Let the students draw, color in and label the living and non-living things found in a river's ecosystem.

The Rio Grande and Me

El Río Grande y Yo

Explorer's Name _____

Color It Wild!



Carlos and Kate want to go see dolphins in the Gulf of Mexico. Help them travel down the Rio Grande by finding and coloring the animals and plants along the way.

Bald Eagle

Elk

Rainbow Trout

Pine Trees

Cattails

Cottonwoods

Dragonfly

Gopher Snake

Sabal Palms

Sea Oats

Parrot

Kangaroo Rat

Sea Star

Dolphin

Stewardship

Rivers are among the most important geographical features of the planet. Everywhere rivers are found, there are many different kinds of living organisms using them, especially humans. Humans living along the Rio Grande have changed it in many ways, by building dams and ditches along its course; by emptying chemicals and waste materials into it; by allowing cattle to trample its banks. Wetlands and young bosques of the Rio Grande have nearly disappeared. Testing the quality of the Rio's water regularly is one way to figure out what we need to do to keep the river healthy. Many people who work for government and civic organizations, along with concerned citizens, care about the Rio and work hard to maintain and reestablish the many kinds of plants and animals threatened by polluted water. The best cure for pollution, however, is learning how to avoid creating it.

River Rangers

Observe ways we can protect the Rio Grande.

Science: Identify choices people have in the care of the environment and the consequences of those choices.

Social Studies: Begin to identify ways to protect water, air and land.

Introduction: With an increasing human population along areas of the Rio Grande, the opportunity for problems on the river also increases. By observing the river ecosystem people will be better able to protect it.

- Have you ever seen the Rio Grande?
- What did it look like?
- Did you see things that didn't belong there, either in the river or along its banks?
- What can we do to help the Rio Grande?

By recycling, conserving water and controlling pollution we can keep the river healthy for all living things.

Safe to Drink?

Identify visible and invisible factors that may affect water quality.

Science: Observe and describe states of water and changes in them.

Health and Wellness: Identify safety hazards in the environment.

Introduction: Pollution is caused by the introduction of any substance (natural or synthetic) that leads to an unhealthy or hazardous condition. Some forms of water pollution are not easily seen. People use a variety of tests to determine the quality of water. Ask students what they think pollution is.

- Where have you seen pollution?
- What kinds of things could pollute the Rio?
- Why do you think people should work hard to keep water in the Rio clean?



WORKSHEET

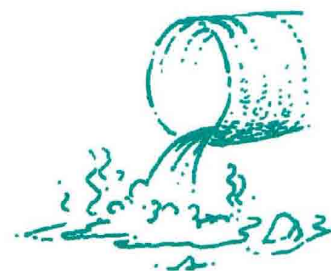
Materials: *River Rangers* worksheet; pencils or crayons.

Procedure: Have the student complete the worksheet by choosing the best activities for the river.

Wrap Up: Have students discuss their choices.

- Why is it important not to waste water?
- How does recycling help the river?
- What can students do to protect the river?

Be a River Ranger and remind people to take care of the river and keep it clean.



ACTIVITY

Materials: A large empty jar; a small jar filled with river or ditch water; a small jar filled with water from the school water fountain; a small jar filled with muddy water (mix before class); coffee filter.

Procedure: Label the three jars of water. Show the jars to the students. Ask: Which water might you drink? Why? If the only water to wash your clothes in was this (show them a muddy sample), what would you do? Demonstrate how people get clean water into their homes by using a filter. Place the filter over the large jar and slowly pour the muddy water through it. Would this water be safe to drink?

Wrap Up: Help children realize that preventive measures are the best way to keep water clean.

- Does the filter keep all the pollution away?
- What are the other ways we can keep water clean?
- What is the best way to protect living things from pollution?

Remind the students that even though the sample looks clean, some things can't be seen with your eyes. Water quality experts use special materials to discover whether water really is safe to drink.



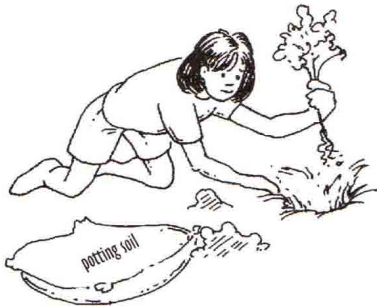
The Rio Grande and Me

El Río Grande y Yo

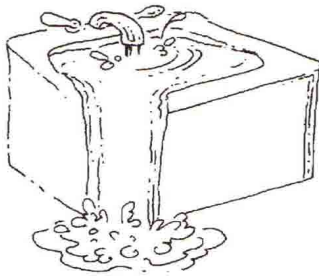
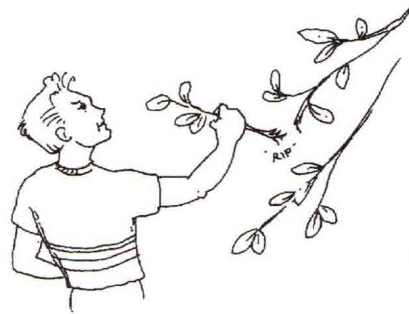
Explorer's Name _____

RIVER RANGERS

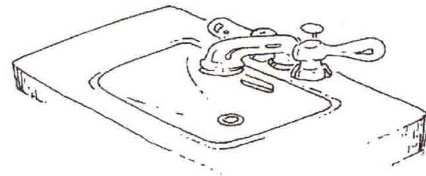
Be a River Ranger by choosing the activity that does NOT harm the river.



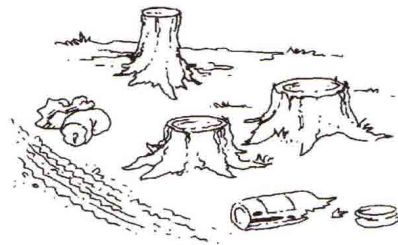
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